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HANNETT, JAMES M	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/726,773	ACHARYA ET AL.	
	Examiner	Art Unit	
	James M Hannett	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 November 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1: Claims 1, and 9-13 are rejected under 35 U.S.C. 102(e) as being anticipated by US 2003/0030729 Prentice et al.

2: As for Claim 1, Prentice et al teaches on Paragraph [0020 and 0022] a method comprising: producing image data in an imaging device (22 and 30) coupled to a processor-based system (12) by a serial bus (42) comprising a bandwidth of at least twelve million bits each second; performing operations on the image data in the imaging device, wherein the operations do not include compression of the image data; and transferring the image data to the processor-based system through the serial bus.

3: As for Claim 9, Prentice et al teaches on Paragraph [0028] performing operations on the image data in the processor-based system.

4: In regards to Claim 10, Prentice et al teaches on Paragraph [0036] performing operations in the processor-based system further comprising performing color interpolation on the image data.

5: As for Claim 11, Prentice et al teaches on Paragraph [0039] performing operations on the image data in the processor-based system further comprising performing color space conversion on the image data.

6: In regards to Claim 12, Prentice et al teaches on Paragraph [0034 and 0041] performing operations on the image data on the processor-based system further comprising performing automatic white balance and tone scale adjustment on the image data.

7: As for Claim 13, Prentice et al teaches on Paragraph [0043] performing compression on the image data.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8: Claims 2-6, 14-22, 25-30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0030729 Prentice et al.

9: In regards to Claim 2, Prentice et al teaches on Paragraph [0029-0030] performing operations on the image data further comprising: performing dead pixel substitution on the image data. However, Prentice et al teaches that the image processing to perform dead pixel substitution is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in

order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of dead pixel substitution in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

10: As for Claim 3, Prentice et al teaches on Paragraph [0021] performing dark current subtraction on the image data. However, Prentice et al teaches that the image processing to perform dark current subtraction is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of dark current subtraction in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

11: In regards to Claim 4, Prentice et al teaches on Paragraph [0028] quantizing the image data. However, Prentice et al teaches that the image processing to perform quantizing is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of quantizing in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

12: As for Claim 5, Prentice et al teaches on Paragraph [0041] performing contrast enhancement on the image data. However, Prentice et al teaches that the image processing to perform contrast enhancement is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of contrast enhancement in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

13: In regards to Claim 6, Prentice et al teaches on Paragraph [0030] performing scaled color interpolation on the image data. However, Prentice et al teaches that the image processing to perform scaled color interpolation is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of scaled color interpolation in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

14: In regards to Claim 14, Prentice et al teaches on Paragraph [0020] transferring the image data to the processor-based system (12) through the serial bus (42) further comprising transmitting the image data over a bus that is compliant with a universal serial bus, revision 1.0, specification. However, Prentice et al does not teach that a USB connection that is compliant with a universal serial bus, revision 2.0, specification can be used.

Official notice is taken that it was well know in the art at the time the invention was made to use USB connection that is compliant with a universal serial bus, revision 2.0 in place of the older USB connections in order to improve transition speed. Furthermore, it was well known in the art at the time the invention was made that universal serial bus, revision 2.0 transmits at a rate higher than twelve million bits per second.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the USB connection of Prentice et al with the newer USB connection compliant with a universal serial bus, revision 2.0 order to improve transition speed.

15: As for Claim 15, Prentice et al teaches on Paragraph [0020] transferring the image data to the processor-based system (12) through the serial bus (42) further comprising transmitting the image data over a bus that is compliant with a universal serial bus, revision 1.0, specification. However, Prentice et al does not teach that a USB connection that is compliant with a universal serial bus, revision 2.0, specification can be used.

Official notice is taken that it was well know in the art at the time the invention was made to use USB connection that is compliant with a universal serial bus, revision 2.0 in place of the older USB connections in order to improve transition speed. Furthermore, it was well known in the art at the time the invention was made that universal serial bus, revision 2.0 transmits at a rate higher than twelve million bits per second.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the USB connection of Prentice et al with the newer USB connection compliant with a universal serial bus, revision 2.0 order to improve transition speed.

16: In regards to Claim 16, Prentice et al teaches on Paragraph [0020 and 0022] and depicts in Figure 1 an imaging device comprising: a sensor to receive incident light and produce image data (20); and an interface (42) to connect the imaging device to a processor-based system (12), wherein the imaging device (22 and 30) sends uncompressed image data to the processor-based system (12) using a serial bus (42). Prentice et al teaches on Paragraph [0020] transferring the image data to the processor-based system (12) through the serial bus (42) further comprising

transmitting the image data over a bus that is compliant with a universal serial bus, revision 1.0, specification. However, Prentice et al does not teach that a USB connection that is compliant with a universal serial bus, revision 2.0, specification can be used.

Official notice is taken that it was well know in the art at the time the invention was made to use USB connection that is compliant with a universal serial bus, revision 2.0 in place of the older USB connections in order to improve transition speed. Furthermore, it was well known in the art at the time the invention was made that universal serial bus, revision 2.0 transmits at a rate higher than twelve million bits per second.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the USB connection of Prentice et al with the newer USB connection compliant with a universal serial bus, revision 2.0 order to improve transition speed.

17: As for Claim 17, Claim 17 is rejected for reasons discussed related to Claim 16.

18: In regards to Claim 18, Prentice et al teaches on Paragraph [0019] a software program to operate on the uncompressed image data.

19: As for Claim 19, Prentice et al teaches on Paragraph [0029-0030] a read only memory wherein the software program performs dead pixel substitution on the uncompressed image data using the read-only memory.

20: In regards to Claim 20, Prentice et al teaches on Paragraph [0028] the software program performs dark current subtraction on the uncompressed image data using the read-only memory.

21: As for Claim 21, Prentice et al teaches on Paragraph [0040-0041] further comprising a look-up table, wherein the software program uses the look-up table to quantize the uncompressed image data.

22: In regards to Claim 22, Prentice et al teaches on Paragraph [0040-0041] the software program performs contrast enhancement on the uncompressed image data using the look-up table.

23: As for Claim 25, Prentice et al teaches on Paragraph [0020 and 0022] an article comprising a medium for storing a software program to enable a processor-based system (12) to: produce image data; perform operations on the image data, wherein the operations do not include compression; and transfer the image data to a second processor-based system through a serial bus (42), revision 1.0, specification. However, Prentice et al does not teach that a USB connection that is compliant with a universal serial bus, revision 2.0, specification can be used.

Official notice is taken that it was well know in the art at the time the invention was made to use USB connection that is compliant with a universal serial bus, revision 2.0 in place of the older USB connections in order to improve transition speed. Furthermore, it was well known in the art at the time the invention was made that universal serial bus, revision 2.0 transmits at a rate higher than twelve million bits per second.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the USB connection of Prentice et al with the newer USB connection compliant with a universal serial bus, revision 2.0 order to improve transition speed.

24: In regards to Claim 26, Prentice et al teaches on Paragraph [0037] storing the software program to enable the processor-based system to further: optionally perform color interpolation in the second processor-based system (12).

25: As for Claim 27, Prentice et al teaches on Paragraph [0029-0030] performing operations on the image data further comprising: performing dead pixel substitution on the image data.

However, Prentice et al teaches that the image processing to perform dead pixel substitution is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of dead pixel substitution in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

26: In regards to Claim 28, Prentice et al teaches on Paragraph [0021] performing dark current subtraction on the image data. However, Prentice et al teaches that the image processing to perform dark current subtraction is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of dark current subtraction in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the

computer and therefore allow the camera to increase the image quality of images independent of the computer system.

27: As for Claim 29, Prentice et al teaches on Paragraph [0028] quantizing the image data. However, Prentice et al teaches that the image processing to perform quantizing is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of quantizing in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

28: In regards to Claim 30, Prentice et al teaches on Paragraph [0041] performing contrast enhancement on the image data. However, Prentice et al teaches that the image processing to perform contrast enhancement is performed in the computer and not in the camera.

Official notice it taken that it was well known in the art at the time the invention was made to enable digital cameras to perform image processing techniques within the camera in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the image processing technique of contrast enhancement in the camera of Prentice et al instead of the computer, in order to decrease the complexity of the computer and therefore allow the camera to increase the image quality of images independent of the computer system.

29: In regards to Claim 32, Claim 32 is rejected for reasons discussed related to claim 26/

30: Claims 7, 8, 23, 24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0030729 Prentice et al in view of USPN 6,269,181 Acharya.

31: As for Claim 7, Prentice et al teaches in Paragraph [0021] the use of a camera system that uses an image sensor (20) with pixels arranged in a Bayer arrangement. Prentice et al further teaches in Paragraph [0028] that the pixels output from the image sensor in a Bayer arrangement are converted to an RGB color format for image processing. However, Prentice et al is silent as to the details of the conversion of the raw pixel data in the Bayer arrangement to to the RGB color data. And does not teach the method of identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component.

Jaspers et al teaches on Column 3, Lines 34-Column 4, Lines 1-20 identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component. Jaspers et al teaches that this method is advantageous for RGB color signal formation because it improves image quality.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the color interpolation method of Jaspers et al to convert the raw data from the image sensor having the Bayer arrangement in Prentice et al to an RGB color format in order to improve image quality.

32: In regards to Claim 8, Prentice et al teaches in Paragraph [0021] the use of a camera system that uses an image sensor (20) with pixels arranged in a Bayer arrangement. Prentice et al further teaches in Paragraph [0028] that the pixels output from the image sensor in a Bayer arrangement are converted to an RGB color format for image processing. However, Prentice et al is silent as to the details of the conversion of the raw pixel data in the Bayer arrangement to to the RGB color data. And does not teach the method of identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component.

Jaspers et al teaches on Column 3, Lines 34-Column 4, Lines 1-20 identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component. Jaspers et al teaches that this method is advantageous for RGB color signal formation because it improves image quality.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the color interpolation method of Jaspers et al to convert the raw data from the image sensor having the Bayer arrangement in Prentice et al to an RGB color format in order to improve image quality.

33: As for Claim 23, Prentice et al teaches in Paragraph [0021] the use of a camera system that uses an image sensor (20) with pixels arranged in a Bayer arrangement. Prentice et al further teaches in Paragraph [0028] that the pixels output from the image sensor in a Bayer arrangement are converted to an RGB color format for image processing. However, Prentice et al is silent as to the details of the conversion of the raw pixel data in the Bayer arrangement to to the RGB color data. And does not teach the method of identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component.

Jaspers et al teaches on Column 3, Lines 34-Column 4, Lines 1-20 identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component. Jaspers et al teaches that this method is advantageous for RGB color signal formation because it improves image quality.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the color interpolation method of Jaspers et al to convert the raw data from the image sensor having the Bayer arrangement in Prentice et al to an RGB color format in order to improve image quality.

34: In regards to Claim 24, Prentice et al teaches in Paragraph [0021] the use of a camera system that uses an image sensor (20) with pixels arranged in a Bayer arrangement. Prentice et al further teaches in Paragraph [0028] that the pixels output from the image sensor in a Bayer arrangement are converted to an RGB color format for image processing. However, Prentice et al is silent as to the details of the conversion of the raw pixel data in the Bayer arrangement to to

the RGB color data. And does not teach the method of identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component.

Jaspers et al teaches on Column 3, Lines 34-Column 4, Lines 1-20 identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component. Jaspers et al teaches that this method is advantageous for RGB color signal formation because it improves image quality.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the color interpolation method of Jaspers et al to convert the raw data from the image sensor having the Bayer arrangement in Prentice et al to an RGB color format in order to improve image quality.

35: As for Claim 31, Prentice et al teaches in Paragraph [0021] the use of a camera system that uses an image sensor (20) with pixels arranged in a Bayer arrangement. Prentice et al further teaches in Paragraph [0028] that the pixels output from the image sensor in a Bayer arrangement are converted to an RGB color format for image processing. However, Prentice et al is silent as to the details of the conversion of the raw pixel data in the Bayer arrangement to to the RGB color data. And does not teach the method of identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components from the sub-block; and averaging the pair of green components to produce a new green component.

Jaspers et al teaches on Column 3, Lines 34-Column 4, Lines 1-20 identifying a sub-block of a Bayer pattern sensor in the imaging device; extracting a pair of green components

from the sub-block; and averaging the pair of green components to produce a new green component. Jaspers et al teaches that this method is advantageous for RGB color signal formation because it improves image quality.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the color interpolation method of Jaspers et al to convert the raw data from the image sensor having the Bayer arrangement in Prentice et al to an RGB color format in order to improve image quality.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPN 6,727,945 Jaspers teaches a color signal interpolation method; USPN 6,269,181 Acharya teaches a color interpolation method of a Pixel with a Bayer arrangement.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M Hannett whose telephone number is 703-305-7880. The examiner can normally be reached on 8:00 am to 5:00 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 703-305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James M. Hannett
Examiner
Art Unit 2612

JMH
July 26, 2004

TUAN HO
PRIMARY EXAMINER